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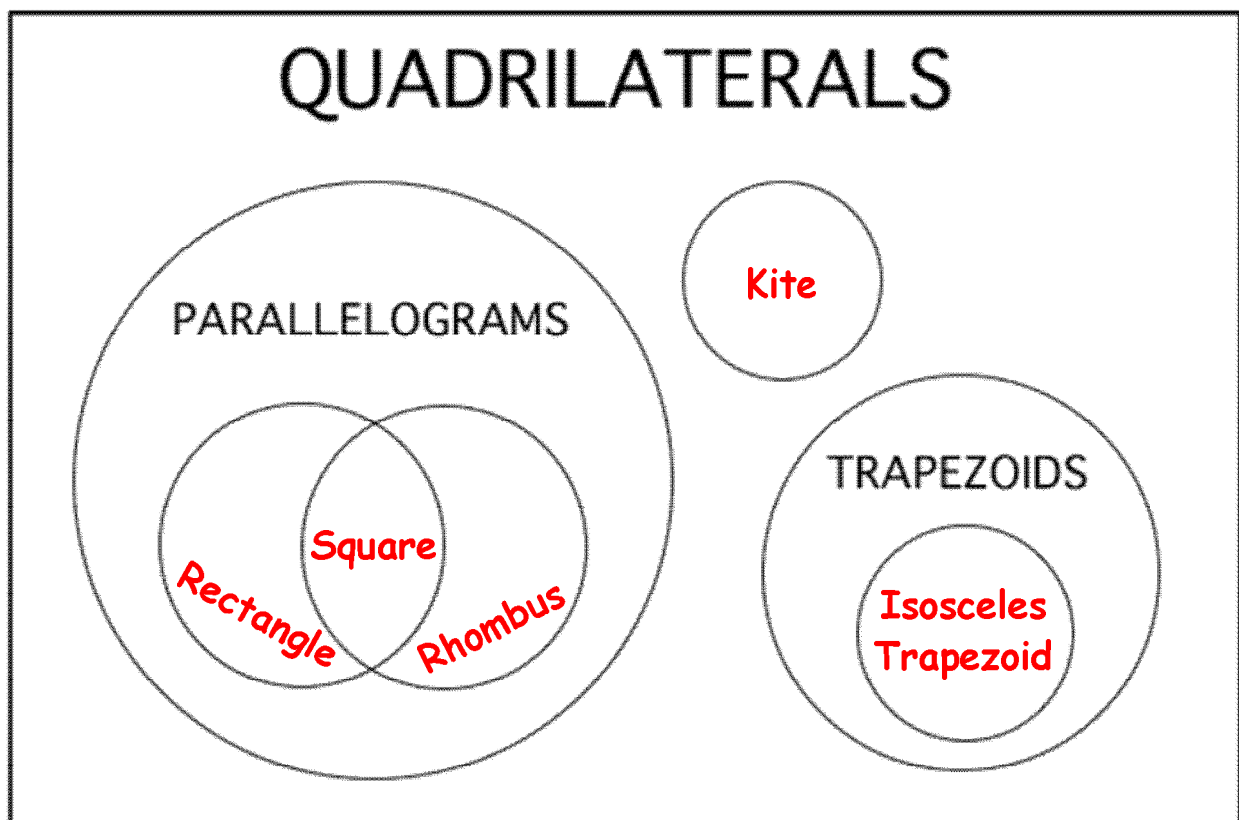
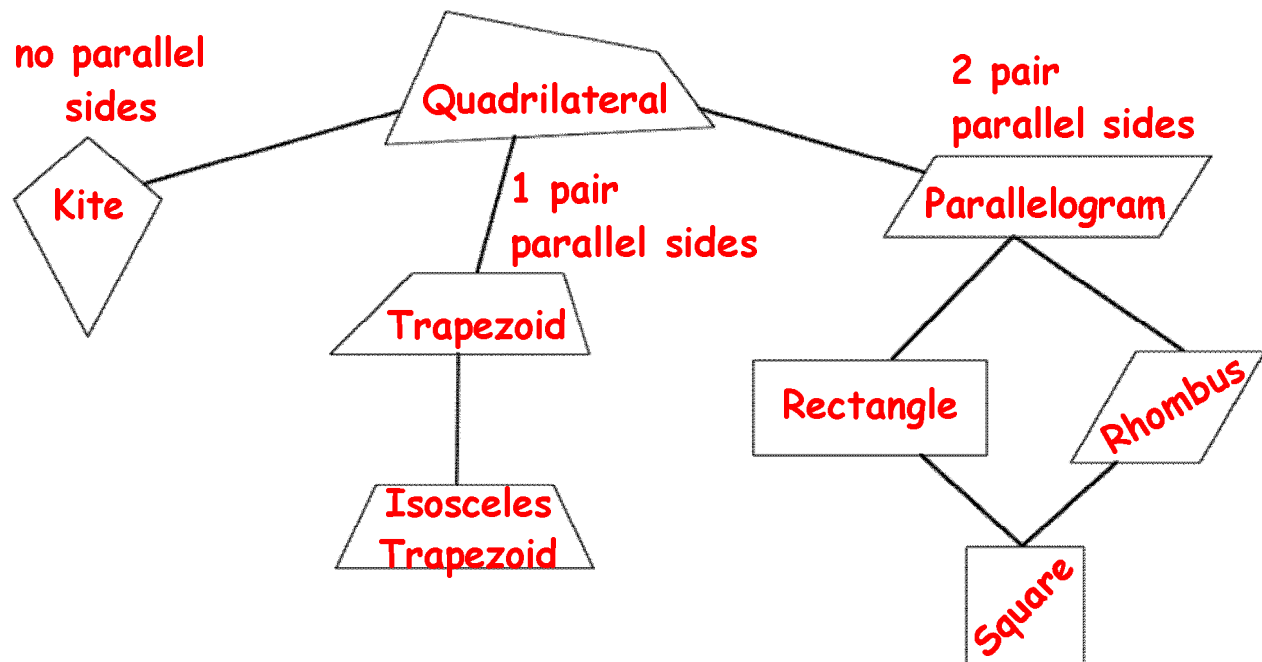
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Properties Booklet:



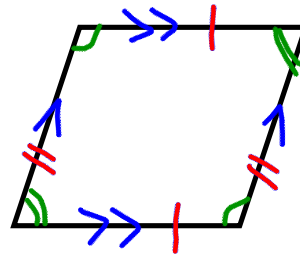
Properties of a Parallelogram.

Page 1

Quadrilateral



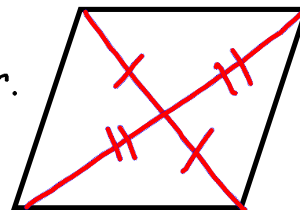
Parallelogram



Properties:

- Opposite sides are parallel.
- Opposite sides are congruent.
- Opposite angles are congruent.
- Consecutive angles are supplementary.

- The diagonals bisect each other.



Quadrilaterals Book

Proving a Quadrilateral is a Parallelogram.

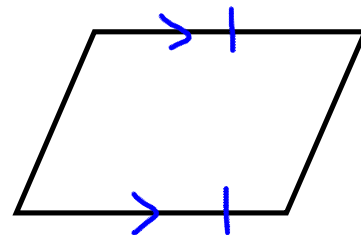
Proving it's a Parallelogram:

Page 2

Show any of the following:

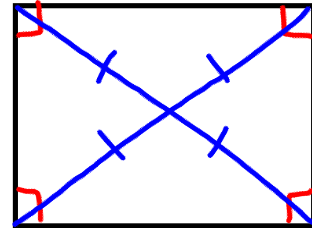
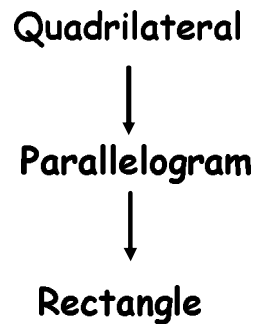
- Both pairs of opposite sides parallel.
- Both pairs of opposite sides are congruent.
- Both pairs of opposite angles are congruent.
- The diagonals bisect each other.

- ONE pair of opposite sides are both congruent and parallel



Properties of a Rectangle.

Page 3



Rectangle Properties:

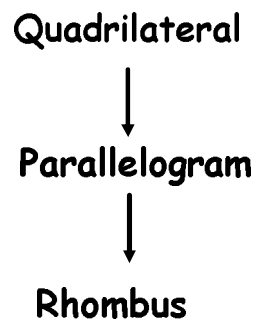
- All properties of a Parallelogram.
- It has 4 right angles.
- The diagonals are congruent.
 - The diagonals create 4 isosceles triangles.

Proving it's a Rectangle:

- If a quadrilateral has 4 right angles, it's a Rectangle.
- If the diagonals of a parallelogram are congruent, it's a Rectangle.

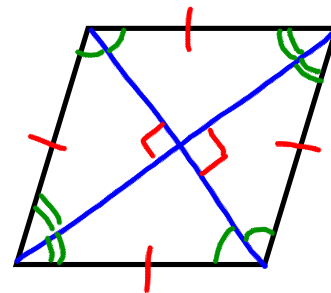
Properties of a Rhombus.

Page 4



Rhombus Properties:

- All properties of a Parallelogram.
- It has 4 congruent sides.
- Its diagonals are perpendicular.
- Each diagonal bisects the pair of opposite angles.
 - The diagonals create 4 \cong right triangles.

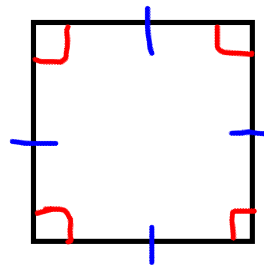
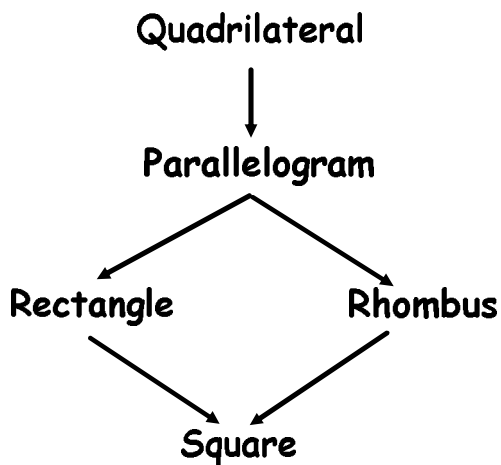


Proving it's a Rhombus:

- If a quadrilateral has 4 congruent sides, it's a Rhombus.
- If the diagonals of a parallelogram are perpendicular, it's a Rhombus.
- If each diagonal of a parallelogram bisect a pair of opposite angles, it's a Rhombus.

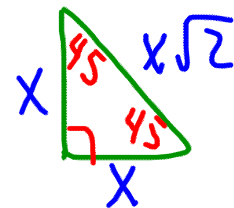
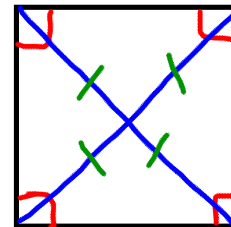
Properties of a Square.

Page 5



Square Properties:

- All properties a Parallelogram.
- All properties of a Rectangle.
- All properties of a Rhombus.
- The diagonals create 4 \cong right triangles (45-45-90 triangles).



Proving it's a Square:

- If a quadrilateral is BOTH a Rhombus and a Rectangle, it's a Square.

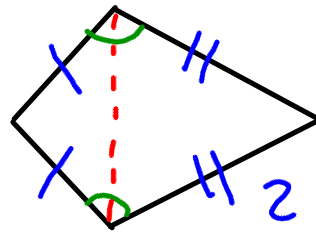
Properties of a Kite.

Page 6

Quadrilateral



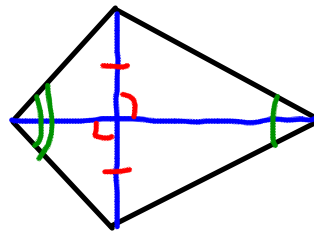
Kite



2 ISOSCELES
TRIANGLES

Kite Properties:

- A quadrilateral with 2 pairs of consecutive \cong sides, but opposite sides are not \cong .
- It has exactly 1 pair of opposite angles that are \cong .
- The diagonals are perpendicular.
- One diagonal bisects a pair of opposite angles.
- One diagonal is the perpendicular bisector of the other.
- The diagonals create 4 right triangles.



Proving it's a Kite:

- If a quadrilateral has 2 pair of consecutive \cong sides but opposite sides are not \cong , it's a kite.
- If one diagonal is the perpendicular bisector of the other, it's a kite.

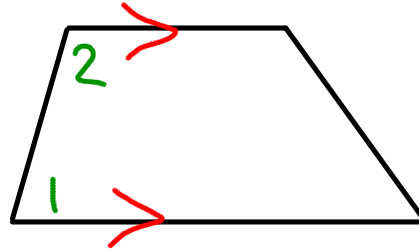
Properties of a Trapezoid.

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Quadrilateral



Trapezoid



Trapezoid Properties:

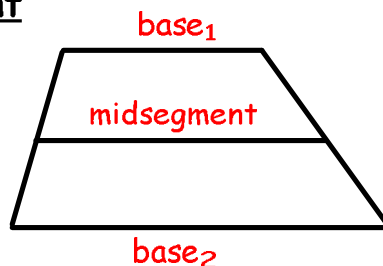
- A quadrilateral with only 1 pair of parallel sides.
- Two pair of consecutive angles are supplementary
 - Parallel sides called bases
 - Non-parallel sides called legs

Proving it's a Trapezoid:

- If a quadrilateral has only 1 pair of parallel sides, it's a trapezoid.

.....

Mid-Segment



$$\text{midsegment} = \frac{\text{base}_1 + \text{base}_2}{2}$$

Properties of an Isosceles Trapezoid. Page 8

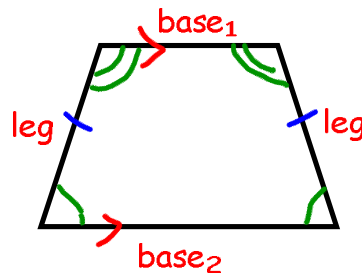
Quadrilateral



Trapezoid

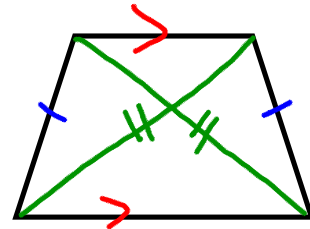


Isosceles
Trapezoid



Isosceles Trapezoid Properties:

- All the properties of a trapezoid, plus...
- The legs are congruent
- The base angles are congruent
- The diagonals are congruent



Proving it's an Isosceles Trapezoid:

- If it is a trapezoid and _____ it's an isosceles trapezoid.
- The legs are congruent
- The base angles are congruent
- The diagonals are congruent

Quadrilaterals Book

Coordinate Formulas

Page 9

(x_1, y_1) and (x_2, y_2)

Slope: $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

Distance:
(length) $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint: $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

Shapes in the Coordinate Plane

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Parallelograms:

- Opposite sides parallel (slopes are =)
- Opposite sides congruent (lengths are =)
- Diagonals bisect each other (same midpoints)

Rectangles:

- Diagonals congruent (lengths are =)
- Right angles (slopes are opposite reciprocals)
(sides perpendicular)

Rhombuses:

- All sides congruent (lengths are =)
- Diagonals perpendicular (slopes are opposite reciprocals)

Squares:

- Something from BOTH Rhombus and Rectangle